REMARKS

Applicant wishes to thank the Examiner for the detailed remarks. Claims 12-15, 17, 20-24, 26-28 have been amended. Claims 1-11 and 19 are cancelled. Accordingly, claims 12-18 and 20-34 are pending.

Paragraph [00028], lines 9-18 was objected under 35 U.S.C. §132(a) because it introduces new matter. Applicant disagrees. The added section which the Examiner contends is new matter is reproduced below underlined with support therefore from the original filed specification. Applicant respectfully requests reconsideration of the new matter objection.

The power source 60 is preferably a 15 kVa generator which provides a 115 volt, 400 Hz 3 phase potential drives the electric motor 34 and simultaneously provides the reference signal.

> The isolation system 10 may be powered by any of a variety of known methods, especially methods which may require transmission from a stationary to a rotating reference system. In the described embodiment, the power source 60 for the drive and control means, 30 and 40, respectively, is a 15 kVa generator 60 which provides a 115 volt, 400 Hz 3 phase potential.
> [*original specification page 9, lines 25-29*]
>
> While the speed sensor 46 may be a dedicated unit for sensing rotor speed, the same information may be obtained from a transmission alternator or generator 60, shown in Figure 4, which turns at a predefined speed relative to the rotor speed. Hence, the controller 44 may use phase information from such devices to issue the appropriate control signals to the drive means 30 and to the field generation means 28.
> [*original specification page 9, lines 8-13*]
>
> 7. The device according to claim 5 wherein
> said speed signals are provided by an electric power generator/alternator.
> [original filed claim 7]

The generator is mechanically driven by torque driving transmission 8. As a result, the rotational speed of the generator is a fixed multiple of the speed of the driving gear in the gearbox and of the main rotor NP frequency. The electrical phase of the generator voltage is a fixed multiple of the generator rotational speed. Thus, the electrical voltage phase signal is a reflection of the NP frequency.

> Referring to Figs. 2 and Fig 4, the MRF vibration isolator 10 according to the present invention is disposed in combination with a rotor system 2 comprising a main rotor shaft 4 which is driven about its rotational axis 6 by a torque driving transmission 8.
> [*original specification page 9, lines 6-10*]

> More specifically, the MRF 26 or system mass is (i) disposed at a predetermined distance R from the main rotor shaft axis 6, (ii) driven in the same or opposing rotational direction as the main rotor shaft axis 6 and (iii) driven at a rotational speed greater than the rotational speed 1P of the rotor shaft.
> [*original specification page 9, lines 5-8*]

> Inasmuch as the drive means 30 is mounted directly to the rotating shaft 4 of the rotor system 2, the drive means 30 need only drive the chamber 22 at three additional revolutions per cycle (for each revolution of the rotor system) in the direction of rotation of the rotor system 2 to achieve the desired 4P operating frequency for a 4 bladed rotor. That is, since the working mass 26 is, in a rotating reference system, driven at one revolution per cycle by the rotor system 2 itself, the drive means 30 need only augment the rotational speed 1P of the rotor system 2 by 3P, provided the augmentation is in the same rotational direction, to achieve the necessary 4P (computed by 1P+3P = 4P) frequency in the stationary reference system. Alternatively, the augmented rotation can be opposite to the rotor speed 1P. For example the drive means 30 can augment the rotational speed 1P by rotating the chamber 22 at 5P in the opposite direction to achieve the necessary 4P (computed by 1P-5P = -4P) frequency in the stationary reference system.
> [*original specification page 10, lines 6-22*]

> For any number of rotor blades, the absolute frequency to suppress is NP where N is the number of rotor blades. The augmentation speed of the chamber 22 produced by the drive means 30 is then (N-1)P in the direction of the rotor speed or (N+1)P in the opposite direction.
> [*original specification page 10, lines 22-25*]

As the rotor speed and NP frequency vary while in flight, the electrical voltage phase signal also varies and is perfectly slaved to i.e. a fixed multiple of the rotor speed. This fact makes the voltage signal a good reference signal that will exactly track rotor speed.

> While the speed sensor 46 may be a dedicated unit for sensing rotor speed, the same information may be obtained from a transmission alternator or generator 60, shown in Figure 4, which turns at a predefined speed relative to the rotor speed. Hence, the controller 44 may use phase information from such devices to issue the appropriate control signals to the drive means 30 and to the field generation means 28.
> [*original specification page 9, lines 8-13*]

> 7. The device according to claim 5 wherein
> said speed signals are provided by an electric power generator/alternator.
> [original filed claim 7]

Claims 18, 24, and 28 were rejected under 35 USC §112, first paragraph, as failing to comply with the written description requirement. As delineated above, Applicant disagrees with the new matter rejections. As such, claims 18, 24, and 28 are properly allowable.

Claims 1, 2, 4, 19, and 21-23 were rejected under 35 USC §112, second paragraph. The Examiner contends that the term "selectively" renders the claims indefinite. Although Applicant disagrees, Applicant has removed the term "selectively" from claims 1 and 21 such that the claims are no longer limited by the term "selectively."

Claims 1, 2, 4, and 11-20 were rejected under 35 USC §103(a) as being unpatentable over *Case et al* in view of *Hooper*. Applicant respectfully traverses these rejections as there is absolutely no teaching, suggestion, or motivation to modify *Case* in view of *Hooper* as proposed. The Examiner argues that:

> One of ordinary skill in the art of vibration isolation would recognize that *Case's* vibration isolator is an excellent apparatus to dampen vibration; and to be utilized in an aircraft, it would have to be modified with an independently rotating housing such as taught by *Hooper* in order to further dampening the external vibrations that would need to dampen in the environment of an aircraft.

Initially, the Examiner's contention is a completely unsupported subjective statement. ***Case* makes no mention of aircraft which receive vibration from external sources in multiple axes of freedom.** Such external vibrations are not relevant to machine tools which are mounted in a fixed position. That is, only the shaft may be out of balance and that is what *Case* attempts to compensate for – not vibration from external sources. In furtherance to this, *Case* recites at paragraph 0015: "Yet further, a need exists for an imbalance compensator that adds comparatively little weight and rotational inertia to the rotating machine." That is, a specific goal of *Case* is to compensate for an imbalance ***without*** increasing rotational inertia. This may be possible for a fixed machine tool, but it is not possible for a free system such as an aircraft.

The Examiner must completely discount the teaching of *Case* to suggest that one of ordinary skill in the art would modify *Case* with an independently rotating housing. As the Examiner's proposed combination to modify *Case* so that the housing could rotate independently of the rotating system would implicitly increase the rotational inertia thereof, the Examiner's proposed combination is improper as it is improper to modify the base reference in such a way that it ruins the goal or function of the base reference.

Alternatively, there is no motivation to modify a relatively uncomplicated low inertia imbalance compensator for a rotating machine to include a significantly more complex independently rotating housing. That is, the Examiner is attempting to utilize an uncomplicated stationary imbalance compensator of a machine tool for use in an aircraft environment. The proposed combination is therefore improper as there is no motivation to make an uncomplicated device utilized for a particular purpose into a significantly more complicated device for a completely different and contradictory purpose. The only motivation to make the combination as proposed is by following the knowledge disclosed within the present invention. This is impermissible usage of hindsight in an attempt to recreate Applicant's device. Accordingly, the claims are properly allowable for this reason alone.

Claims 21-28 were rejected under 35 U.S.C. §103(a) as being unpatentable over *Hooper* in view of *Case*. Applicant respectfully traverses these rejections as there is absolutely no teaching, suggestion, or motivation to modify *Hooper* in view of *Case* as proposed. *Hooper* discloses a mechanical vibration absorption system for a rotary wing aircraft or a propeller like device having a rotating hub and a plurality of radial members. [See *Hooper*, Col. 8, lines 49-55]. *Hooper* makes no mention of MRF, or the electromagnetic shifting of a MRF. ***The vibration absorption system of Hooper is completely based on a mechanical gear arrangement.*** There is therefore no motivation to incorporate a MRF fluid system of *Case* into a purely mechanical gear train system of *Hooper*. The only motivation to make the combination as proposed is by following the knowledge disclosed within the present invention. This is impermissible usage of hindsight in an attempt to recreate Applicant's device. Accordingly, the claims are properly allowable.

Even if the combination of *Case* in view of *Hooper* or *Hooper* in view of *Case* were properly made – which they are not - there are differences between the claimed invention and the teachings of the cited references so that the combination does not meet the limitations of Applicant's claims. ***The Hooper vibration absorption system does not rotate independently of the rotor system.*** The *Hooper* system rotates only at a constant ratio with respect to the rotational speed of the rotor hub. [See *Hooper*, Col. 8, lines 64-66 and lines 70-73.] The Examiner admits that the *Case* housing rotates with the shaft 20 and does not rotate independently thereto. *Hooper* rotates at a constant speed ratio relative to the rotor system and *Case* rotates at a constant speed that is the same speed of the shaft. Thus, even if properly combinable – which they are not -- *Case* in view of *Hooper* or *Hooper* in view of *Case* cannot respond to varying flight regimes as disclosed and claimed by Applicant by providing an enclosed chamber which is ***rotatable independent*** of the rotating system. *[Also see Applicants specification ¶ 0035]* In either case, the combined references failure to disclose or suggest Applicant's claimed invention.

Please charge $300 to Deposit Account No. 19-2189 in the name of Sikorsky Aircraft Corporation, for 2 claims in excess of 20 and 1 additional independent claim. If any additional fees or extensions of time are required, please charge to Deposit Account No. 19-2189.

Applicant respectfully submits that this case is in condition for allowance. If the Examiner believes that a teleconference will facilitate moving this case forward to being issued, Applicant's representative can be contacted at the number indicated below.

Respectfully Submitted,
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